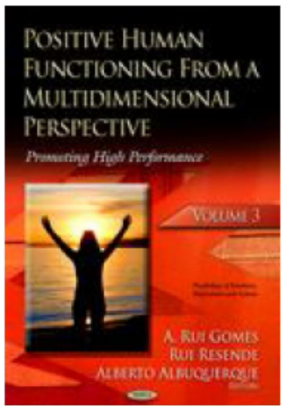
Citation of this chapter:

Gomes, A. R. (2014). Positive human functioning in stress situations: An interactive proposal. In A. R. Gomes, R. Resende, & A. Albuquerque (eds.), *Positive human functioning from a multidimensional perspective: Promoting stress adaptation* (Vol. 1, pp. 165-194). New York: Nova Science.

Versão original:

https://www.novapublishers.com/catalog/product_info.php?products_id=47544



Chapter 8

POSITIVE HUMAN FUNCTIONING IN STRESS SITUATIONS: AN INTERACTIVE PROPOSAL

Rui Gomes
Department of Applied Psychology, School of Psychology, University of Minho, Portugal

ABSTRACT

Understanding human adaptation to stressful situations is a fascinating and complex topic. Most of this complexity derives from the ambiguity of the concept of stress, the factors that explain human functioning when exposed to stress conditions, and the characteristics of the situation that can be associated with stress reactions. However, the actuality of the phenomenon and the increasing effects on human well-being in a broad set of living contexts demands answers and solutions from science to mitigate the negative consequences of stress. One of the major areas that can help reach this goal is proposing or refining conceptual models that explain human adaptation to stress.

Taking as a starting point the cognitive-motivational-relational theory of emotions of Lazarus (1991, 1999), this chapter proposes an interactive model of human adaptation, discussing six aspects: (a) the importance of the stressful event during the process of human adaptation to stress; (b) the influence of antecedent factors (situational and personal characteristics) on human adaptation to stress events; (c) the central role of cognitive appraisal in human adaptation to stressful events; (d) the levels of responses implicit to a stressful situation; (e) the interactive process between the first level of cognitive appraisal, the responses, and the second level of cognitive appraisal; and (f) the event outcomes. The chapter terminates by discussing the mediating role of cognitive appraisal in the relation between stressful events and the event outcomes and by proposing some questions for future research.

Considering all aspects, the interactive model of human adaptation is a tentative proposal to explain how individuals adapt to stressful situations that needs further investigation to confirm its utility.

INTRODUCTION

One of the most accepted ideas about living contexts, particularly the ones where individuals have to perform a certain task (e.g., work, sport, arts), is that they are becoming more and more stressful. The sources of stress are also becoming broader and more intense, thereby making it necessary to use efficient ways of coping that promote positive human adaptation. However, the relationship between stress and human adaptation is far from simple, implying the understanding of situational and personal factors involved in the ways humans perceive and respond to their performance contexts[1]. One method of understanding the complexities of human adaptation to stress is by proposing conceptual models that can help understand how individuals achieve their best performance in their living contexts and how they can use these same contexts to be realized as human beings.

The purpose of this chapter is to discuss the factors that are implicated in human adaptation to stress, being proposed the Interactive Model of Human Adaptation to Stress that relies mainly on the cognitive-motivational-relational theory of stress and emotions of Lazarus (1991, 1999) and the subsequent adaptations proposed by Fletcher, Hanton, and Mellalieu (2006) and Folkman (2008). In addition, concepts related to the sources of stress (Occupational Stress Model; Cooper & Marshall, 1976), the fit between the person and the environment (Person–Environment Fit; Edwards, Caplan, & Van Harrison, 1998), and the importance of personal control over work (Job Demands-Control model; Karasek, 1979; Karasek & Theorell, 1990) were also considered in the model.

More specifically, the chapter progresses from the analysis of the main dimensions included in the interactive model (e.g., characteristics of the stressful events, antecedent factors, cognitive appraisal, responses, and event outcomes) to discuss the mediating role of cognitive appraisal in the relation between stressful events and event outcomes and proposes questions for future research.

THE INTERACTIVE MODEL OF HUMAN ADAPTATION TO STRESS

There are some main prepositions of the interactive model that should be described now because they will be the basis for explaining this proposal along the chapter.

- The comprehension of human adaptation to stress is best achieved by adopting a process-oriented approach that assumes the dynamic nature of the relationship between the individual and the environment.
- The capture of this dynamic process implicates the analysis of the temporal sequence of demands (e.g., stressful events), the antecedent factors at the situational and personal levels, the cognitive appraisal at the first and second levels, the responses, and the event outcomes of human adaptation. By focusing on one or more of these variables alone results in a partial vision of the factors that explain human adaptation to stress.

[1] Throughout the chapter, terms like “performance contexts”, “performance situation”, and “performance settings” will be used interchangeably when referring to the cases where there is a specific and demanding task that the individual has to accomplish.

- The model, as proposed by Lazarus (1991), assumes that stress is not a property of the individual or the environment but resides in the transaction between the two. Several aspects can characterize both the individual and the environment (as will be discussed later), but the important point is that the dynamic experience of stress is best understood when both factors are analyzed in conjunction.
- The model is interactive because it proposes that human adaptation is an ongoing process that can be made by advances and setbacks in the process of coping with stress, assuming interactive influences between the first level of cognitive appraisal, the responses, and the second level of cognitive appraisal in a bidirectional way, as such: first level of cognitive appraisal ↔ responses ↔ second level of cognitive appraisal.
- Stress is an ongoing transaction between environmental demands and personal resources. Strain (*negative human functioning*) is a consequence of an imbalance between these demands and resources (Cox, 1985; Lazarus, 1999; McGrath, 1970); by the contrary, well-being (*positive human functioning*) is a consequence of a balance between these demands and resources.
- The concept of human adaptation assumed in the interactive model shares the definition proposed by Tamminen, Crocker, and McEwen (this volume); these authors understand adaptation in sports as an ongoing process of continual adjustment to changing physical, social, and psychological conditions. In this way, for the interactive model the process of adaptation involves the processes of cognitive appraisal, the responses (at the emotional, cognitive, behavioral levels), and the adjustment to the appraised conditions.
- The central factor to comprehend human responses during stressful events is cognitive appraisal; it is not only involved in the onset of psychological, physiological, and behavioral responses but also involved in how these same responses will be interpreted and managed.
- The process of human adaptation does not need to go through all the steps proposed in the model; on the contrary, it can end when the individual does not attribute importance to the stressful event or when the person has achieved an event outcome of positive or negative human functioning.
- There is no reason to believe that human adaptation to stress finishes after primary and secondary cognitive appraisals; further, there is no reason to believe that tertiary and quaternary cognitive appraisal will only be mobilized if things go wrong. In contrast, positive adjustments to stressful events after primary and secondary cognitive appraisals can also implicate additional efforts in order to improve personal adjustment to the situation.
- The interactive model advances the possibility that cognitive appraisal can mediate the relation between stressful events and the event outcomes and the possibility that antecedent factors can be moderator variables between the stressful event and the event outcomes.
- Stressful events are not static entities that exert a major influence only at the beginning of the adaptation process. In contrast, they can exert an influence along the process of human adaptation, thereby reinforcing the dynamic nature of the person-environment relationship.

Considering all these central aspects, we now turn our attention to each of the dimensions proposed in the model, which is presented in Figure 1.

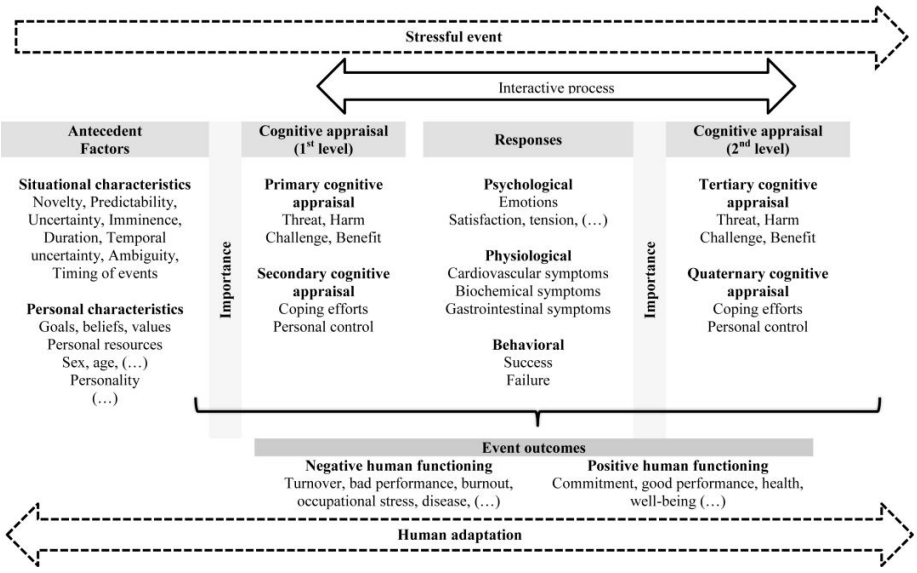


Figure 1. Interactive model of human adaptation to stress.

Stressful Event

Historically, stress has been analyzed in one of three ways: as a stimulus (including the factors that can induce distress to the individual), as a response of the individual to stressful events (including psychological, physiological, and behavioral consequences), and as an interaction between the person and the stressful situation (for a review, see Cooper & Dewe, 2004). The last one has a major influence on this chapter and in the way the phenomenon of human adaptation to stress is conceived. However, by assuming this last perspective, it does not mean the other two perspectives are useless or meaningless. It is correct that these perspectives have problems in regard to explaining individual differences to the stress event (stimulus approach) and why responses to stress do not always assume the same pattern (response approach). However, they have the merit of highlighting the factors that can disrupt human functioning in performance contexts (e.g., work and sport contexts) and the consequences that stressors can have on human functioning. It is important to know if the nature of stressors is changing across time, leading to "new" or "more intense" responses to stress. Comprehending the nature of stress and evaluating the specific responses to stress continues to be an important task for stress research. The reactions to stress factors will be addressed later in this chapter under the "responses" of the Interactive Model of Human Adaptation to Stress.

Regarding the stimulus approach, it becomes important to understand the set of stressful factors that can disrupt human functioning; this is proposed in the interactive model that stressful events play a major role in human adaptation to stress. This means that stressful events are not a static entity prior to processes of cognitive appraisal or coping efforts that are assumed by the individual in order to deal with stress. In contrast, it assumes an interactive and dynamic

nature established between the individual and the situation. This means that the stressful event plays a major role during all processes of human adaptation to stress, changing its nature according to the continuous efforts made by the person to cope with stress along this adaptation process (this is why there is a dashed line to signalize the stressful event in Figure 1).

As proposed by Lazarus (1995), research regarding stress in the workplace assumes that sources of stress at work are, to some extent, an individual phenomenon as the ways people cope with stress. This means that in addition to describing the sources of stress that can promote negative human functioning (e.g., the stimulus approach), it is important to analyze the way each individual appraises the stress situation and the way he or she manages the situation. However, the author also recognizes the importance of considering and describing the conditions of work because some types of stressors (e.g., time pressures, work overload, lack of decisional control) can be stressful enough for a large number of workers.

This same perspective is assumed in the interactive model, giving particular relevance to the individual process of human adaptation to stress but also recognizing the importance (and sometimes generalized) effects of some occupational stressors. A deep understanding of stress will be achieved if the nature of the stressful situations and the following process of human adaptation are considered. In this way, the interactive model proposes that the stimulus approach can introduce a deep understanding of the factors involved in the process of human adaptation, but it also assumes that the central aspects involved in this adaptation are related to appraisal and coping, as will be discussed later. This interactive perspective of stress gives attention to the ongoing process that is implicated in the relation between the environment and the individual, being considered the dynamics between these two factors and the personal meaning that each individual builds when facing a stressful event. Stress is viewed as a transaction between the set of demands implicated in each stress event and the individual personal resources; in this way, strain results from an imbalance between these two aspects (Cox, 1985; Lazarus, 1991; McGrath, 1970). This dynamic perspective means that stress is not in the individual or in the situation but results from the interaction between a particular situation and a specific individual. These dynamics can be best understood by analyzing the relational meaning that each person attributes to the stress situation; that is, the meaning a person gives to the relationship he or she has with the environment (Lazarus, 1991).

Antecedent Factors

Two of the most important factors implicated in human adaptation to stress are situational characteristics (e.g., type of organization, culture) and personal characteristics (e.g., personality traits). Both represent antecedent factors that can influence the process of human adaptation to stress events. As referred by Lazarus and Folkman (1984), psychological stress will derive from a transaction between a specific individual that evaluates the situational relevance to his or her well-being and a particular environment with specific features that impose some pressure to the individual. Stressful events include both personal and situational factors, and for that reason, they were integrated in the Interactive Model of Human Adaptation to Stress (see Figure 1).

In what concerns the situational characteristics according to the transactional perspective of Lazarus (1991; Lazarus & Folkman, 1984), more than describing particular sources of stress, it becomes important to identify the reasons why an individual appraises events as stressful. In addition to the importance of aspects related to the organizational culture and the aspects of the

work to do, Lazarus and Folkman (1984) described underlying properties that can turn a situation into a stressful event: (a) novelty of the situation for the individual; (b) predictability of the situation for the individual; (c) uncertainty of the event's occurrence; (d) imminence of the event in terms of time available to anticipate before its occurrence; (e) duration of the event; (f) temporal uncertainty of the event, which is related to the individual ability to know the precise time when the stressful situation will occur; (g) ambiguity of information needed for the appraisal of the event; and (h) timing of event occurrence in relation to the life cycle, which analyzes whether more events are happening in the person's life when the stressful situation occurred. Little research exists on this topic, but some existing findings do support the importance of these properties to the stress response (Dugdale, Eklund, & Gordon, 2002; Kirschbaum, 1999; Marchant, Andersen, & Morris, 1997; Perrez & Reicherts, 1992; Thatcher & Day, 2008). Due their interest, these factors were integrated in the Interactive Model of Human Adaptation to Stress.

Regarding the personal characteristics, Lazarus (1999) describes the importance of analyzing goal commitment, values, beliefs about the self and the environment, and situational intentions. From these factors, goal commitment seems to be a crucial factor because "it implies that a person will strive hard to attain the goal" and that "if there is no goal commitment, there is nothing of adaptational importance at stake in an encounter to arouse a stress reaction'' (Lazarus, 1999, p. 76). These aspects are included in the primary cognitive appraisal proposed by Lazarus (1999) but were included in the interactive model as antecedent factors that can determine the ongoing process of stress confrontation (see Figure 1). This has the advantage of separating the personal meaning of the event (included in the concept of importance for the interactive model) from the factors involved in human adaptation to stress (e.g., appraisal, coping, and event outcomes). For example, if the stressful event undermines valuable personal goals (antecedent factor), then the chance of importance being attributed to the event increases, initiating the process of adaptation to the stressful event. This is somewhat different from the perspective assumed by Lazarus and Folkman (1984) because these factors are already included in the primary cognitive appraisal that will identify the personal significance that the individual will attribute to the stressful event; for the interactive model if no personal significance is given to the situation, then it cannot be appraised as stressful because it has no importance.

Also included in the personal characteristics, the interactive model considers other aspects related to personal resources (e.g., educational level, economic resources, social skills, life experiences, social support, health status, physical abilities) that can influence what an individual will be able or unable to do (Lazarus, 1999; Lundberg, & Cooper, 2011; Payne, 1988).

Personality factors are also included as antecedent factors in the interactive model. As recognized by Lazarus (1995), certain types of persons (e.g., rigid personalities, addicted to drugs, neurotic, depressive tendencies) are likely to react with stress more often or more intensely than others. Research has partially confirmed this idea, namely, the tendency to be more vulnerable to stress and to perceive job situations as more stressful in individuals who are high in negative affectivity (Cassar & Tattersall, 1998; Spector & O'Connell, 1994), who have an external locus of control (Newton & Keenan, 1990; Rees & Cooper, 1992), and who have a Type A behavior pattern (Newton & Keenan, 1990; Payne, 1988). Other dispositional variables have been suggested to buffer the impact of stressors on an individual's experience of strain, for example, hardiness, self-esteem and self-efficacy, and optimism (for a review, see Cooper,

Dewe, & O`Driscoll, 2001). However, further research is still needed to determine the effects of these variables (Cohen & Edwards, 1989).

Finally, it is also evident that demographic variables, such as age and sex, can also affect vulnerability to stress (Jenkins, 1991; Nelson & Quick, 1985; Shirom, Gilboa, Fried, & Cooper, 2008). For this reason, demographic variables were also included as personal antecedent variables in the interactive model.

It is important to note that situational and personal characteristics should be conceived together (Lazarus, 2000a), meaning that personal factors make sense when they are analyzed in the context of the situation, and the situation makes sense in the scenario faced by each individual. The situation can be meaningful to the individual, but it will not be appraised as stressful if it does not assume one or more of the described underlying properties; further, the situation can assume at least one underlying property, but it will not be appraised as stressful if no personal significance is given by the individual (Thatcher & Day, 2008).

Considering these aspects, the Interactive Model of Human Adaptation to Stress suggests the concept of "importance" as the *gate* that opens the process of human adaptation to stress, resulting from the conjunction of situational and personal characteristics (see Figure 1). Overall, this personal meaning attributed to the stressful event will determine if the situation will be faced by the individual; if no importance is attributed to the stressful event, then this event can become, for example, a frustrating or sad situation, but it does not represent an event that requires efforts of human adaptation to stress.

Lazarus (1991) proposes a similar concept described as "relational meaning" that also results from the conjunction of an environment and a person with certain attributes, which together produce a relational meaning that a person construes from his or her relationship with that particular situation.

The concept of "importance" or personal meaning of the Interactive Model of Human Adaptation to Stress also results from the relation between a particular individual and a specific situation, indicating if the process of human adaptation to stress will begin or end at this first moment of confrontation with the stress event. However, for Lazarus, the concept of relational meaning not only results from the environment-individual relation but also is implicated in the subsequent emotional responses In fact, by turning his theory for the analysis of the relational meaning of emotions that are involved in each adaptational encounter, Lazarus (1991, p. 39) assumed "each emotion is defined by a unique and specifiable relational meaning that can be expressed in a *core relational theme* for each individual emotion, which summarizes the personal harms and benefits residing in each person-environment relationship". Considering this step forward proposed by Lazarus, the Interactive Model of Human Adaptation to Stress proposes the concept of "importance" to refer only to this first step of confrontation with stress; this reinforces the idea that with no personal meaning attributed to the stressful event, no efforts of coping will be mobilized to deal with the situation because it was not considered important.

Cognitive Appraisal: 1st Level Processes

Appraisals are evaluations that affect people's beliefs, values and/or goals (Arnold, 1960; Lazarus & Folkman, 1984) having an adaptive function because they indicate whether an event may be good or bad for the individual, generating subsequent action tendencies (Arnold, 1960).

In this way, cognitive appraisal represents reactions to stressful situations that vary according to the way individuals perceive the stressful events. This turns cognitive appraisal a central concept for human adaptation to stressful events.

The Interactive Model of Human Adaptation to Stress describes two processes of cognitive appraisal that derive directly from the transactional proposal of Lazarus (1991): primary and secondary cognitive appraisals (see Figure 1). Primary cognitive appraisal refers to whether what is happening is personally relevant to one's values, goal commitments, beliefs about self and world, and situational intentions, thereby meaning if there is any personal stake in the stressful encounter. According to Lazarus (1991), there are three components of primary appraisal that play a major role in the way each individual perceives and reacts to the stressful encounter: (a) goal relevance: the extent to which an encounter touches on personal goals, meaning if there is no goal relevance there cannot be an emotion; (b) goal congruence or incongruence: the extent to which a transaction is consistent or inconsistent with what the person wants, meaning if it thwarts (goal incongruence) or facilitates (goal congruence) personal goals; and (c) type of ego-involvement: refers to diverse aspects of ego-identity or personal commitments involved in the encounter, meaning if aspects related to self- and social-esteem, moral values, ego-ideals, meanings and ideas are at stake in the encounter.

Secondary cognitive appraisal refers to coping options and prospects, evaluating if there are available personal resources for dealing with harm, threat, or challenge appraisals. In this case, the components for secondary appraisal are (a) blame and credit: relates to knowing who is accountable or responsible for a harm, threat, challenge, or benefit consequence, i.e., the individual or others; (b) coping potential: relates to whether and how the person can manage the demands of the encounter or actualize personal commitments, implying an evaluation of the prospects for doing or thinking something that can, in turn, change or protect the person-environment relationship; and (c) future expectancy: relates to whether, for any reason, things are likely to change psychologically for better or worse (i.e., becoming more or less goal congruent) (Lazarus, 1991). Despite this organization of the components of cognitive appraisal, Lazarus (1991) argues that they are not necessarily sequential and that individuals do not have to go through the entire appraisal process every time a new adaptational encounter is faced.

Regarding the Interactive Model of Human Adaptation to Stress, it is worth remembering that the concept of "importance" already analyzed whether the stress event is *personally relevant*. In this way, when primary cognitive appraisal happens, the event already has a significant personal meaning that requires to be coped by the individual. In this way, for the interactive model, primary cognitive appraisal refers to the first impact of the stressful event in the individual.

The results from the primary cognitive appraisal for the interactive model are described as by Lazarus (1991, 2000b, 2001) (see Figure 1): (a) threat perception (i.e., harm or potential loss that has not yet happened); (b) harm perception (i.e., damage that has already occurred); (c) challenge perception (i.e., difficult-to-attain, yet anticipated gain); and (d) benefit perception (i.e., gain that already occurred). The result of the interaction between the individual and the stressful encounter generates a *relational meaning* (Lazarus, 2000b) that can be organized according to a loss or a gain attributed to anticipated results (i.e., threat and challenge) or to results that are already occurring (i.e., harm and benefit). Additionally, it can coexist in the same situation the threat and challenge perceptions because the same stressful encounter may exhibit aspects that implicate a potential loss while others implicate a potential gain; however, as assumed by Lazarus (1999), one or the other usually dominates.

Secondary cognitive appraisal includes coping efforts made by the individual to deal with the situation and personal control over the situation (see Figure 1). As discussed by Lazarus and Folkman (1984), coping involves cognitive and behavioral efforts that an individual makes to manage demands that tax or exceed the personal resources. These efforts can be organized into problem-focused coping when the person tries to alter the actual relationship between the person and the environment for the better (and if the efforts are successful, then threat and harm can be reduced or even eliminated); it can also be organized into emotion-focused coping when the individual tries to regulate emotional distress caused by threat or harm by using, for example, avoidance of thinking about the sources of stress. Some authors also include a third type of coping related to meaning-focused coping that is used to manage the meaning of a situation (Folkman & Moskowitz, 2004). Regardless of the dimensions that can characterize the concept of coping, this factor is central to explain the stress process and its adaptational outcomes. In fact, psychological stress only occurs if the person evaluates the internal or external demands as taxing or exceeding the individual's resources (Lazarus, 1999).

In addition to coping efforts, the interactive model includes personal control in the secondary cognitive appraisal. Personal control can make a difference in the selection of coping strategies used by the individual to deal with the stress situation (see Figure 1). If the person feels that the stressful encounter can be subject to control by his or her actions, then problem-focused strategies predominate; in contrast, if the person feels that nothing can be done to change the situation, then emotion-focused strategies predominate (Lazarus, 1991). One interesting proposal that can reinforce the importance of control is the Job Demands-Control model (Karasek, 1979; Karasek & Theorell, 1990). The last dimension that was added to the model has social support turning the model to Job Demand-Control-Support (JDCS; Johnson & Hall, 1988; Johnson, Hall & Theorell, 1989). Describing the model is not fundamental for the purpose of reinforcing the concept of control; rather, it should be noted that the model assumes that more important than the set of job demands that can exert pressure to the individual and create strain, it is crucial to consider if he or she has some control over the set of demands to be dealt with. This assumes an interactive effect between the demands and the control on stress levels, meaning that control will buffer (moderate) the impact of demands (pressures) on strain (Dewe, O'Driscoll, & Cooper, 2013).

Overall, primary and secondary cognitive appraisals represent central dimensions for the interactive model. However, it is interesting to note that much more empirical data exists regarding the use of secondary cognitive appraisal (e.g., coping strategies) to deal with stressful events than the impact of primary cognitive appraisal in the selection of coping strategies. As referred by Dewe et al. (2013) in the work stress domain, research related to coping continues to grow while the research related to *primary* cognitive appraisal has not.

To illustrate, studies related to coping have analyzed in great detail aspects related to taxonomies and instruments to evaluate coping (see Schwarzer & Schwarzer, 1996 for a review of coping instruments, and Folkman & Moskowitz, 2004 for a review of coping taxonomies), the use of different coping strategies in stressful situations (Folkman, Lazarus, Dunkel-Schetter, De Longis, & Gruen, 1986; Folkman, Lazarus, Gruen, & DeLongis, 1986; Jordet & Elferink-Gemser, 2012; Macrodimitris & Endler, 2001; Terry & Hynes, 1998), and situational and dispositional coping (Carver & Scheier, 1994; Schnider, Elhai, & Gray, 2007).

By the contrary, the concept of cognitive appraisal has not captured much attention by the research community. However, some studies proposed to evaluate this dimension (Folkman et al., 1986; Kuiper, McKenzie, & Belanger, 1995; Schneider, 2008) and to analyze the

relationship with stress in work (Goh, Sawang, & Oei, 2010) and sport contexts (Dugdale et al., 2002). Other studies analyzed the relationship between cognitive appraisal and the use of coping strategies (Folkman et al., 1986), the feelings of social physique anxiety in exercise (Focht & Hausenblas, 2004), the physiological responses (Tomaka, Blascovich, Kelsey, & Leitten, 1993), and the emotions in sport (Bolgar, Janelle, & Giacobbi, Jr., 2008; Cerin, 2003; Meijen, Jones, McCarthy, Sheffield, & Allen, 2013). However, according to Schneider (2008), there is a scarcity of measures related to the appraisal construct, which can compromise an understanding of the stress process.

In order to give a better idea of questions that can represent the first level of cognitive appraisal, Figure 2 presents examples of psychological dilemmas during this step of human adaptation to stress.

Cognitive Appraisal: 2nd Level Processes

The interactive process between cognitive appraisal and responses goes beyond the concepts of primary and secondary cognitive appraisal proposed by Lazarus (1991, 1999). The interactive model proposes a second level of cognitive appraisal that encompasses tertiary and quaternary cognitive appraisals. These subsequent appraisals are derived from the proposal of sport contexts by Fletcher and Fletcher (2005; see also Fletcher et al., 2006). Tertiary appraisal has been defined as the evaluation of an emotion in terms of whether or not it is relevant to one's performance, meaning that the individual considers the implications of what is at stake, thereby giving meaning to the symptoms. In this case, the individual should consider questions such as "how does this emotion and performance affect me?" Quaternary appraisal occurs only if the individual attributes meaning to an emotion; if that is the case, the individual will identify and analyze the available coping resources in order to deal with the emotion. Quaternary appraisal is a personal evaluation of the coping options, meaning that the individual should consider questions such as "what can I do about this emotion?"

However, one can raise the question as to why two additional cognitive appraisals that, in essence, seem quite similar to primary and secondary cognitive appraisals should be included. In an interesting reflection regarding positive emotions in the stress process, Susan Folkman (2008) makes the case for this need. She defends that the Cognitive Theory of Stress and Coping (Lazarus, 1966; Lazarus & Folkman, 1984) had little to say in situations where the outcome was a unfavorable one, "except that the appraisal-emotion-coping-reappraisal process would repeat itself, thus producing the conditions of chronic stress" (p. 5). This explanation seems quite short when there is a need to comprehend what happens when the individual faces situations that are not favorably resolved. In this case, Folkman proposed a Revised Stress and Coping Model introducing a new category of meaning (meaning-focused coping) that can generate positive emotions. Meaning-focused coping is a type of coping that identifies the individual's tendency to draw on his or her beliefs, values, and existential goals to motivate and sustain coping and well-being during a difficult time (Park & Folkman, 1997). The model proposes that after a failed resolution, there is a need to resolve the problem becoming important the meaning-focused coping that will generate positive emotions and their underlying appraisal. These positive emotions and appraisals will then "influence the stress process by restoring coping resources and providing motivation needed in order to sustain problem-focused coping over the long term. In addition, positive emotions were hypothesized to provide

relief from distress" (p. 5). Thus, the process of human adaptation can continue when individuals face difficult situations and by using meaning-focused coping it can be achieved a better situation that will promote positive emotions.

Considering both the insights of Fletcher and Fletcher (2005) and Folkman (2008), it turns important to consider what happens if after the first level of cognitive appraisal the situation is not resolved. In this case, it becomes necessary to analyze how the process of human adaptation will progress. In this way, concepts such as tertiary and quaternary cognitive appraisals or even meaning-focused coping can add extra understanding to the factors involved in the process of dealing with stressful events. However, two distinctions should be made for the interactive model. First, tertiary and quaternary cognitive appraisals are not only targeted to deal with emotional responses (as stated by Fletcher & Fletcher, 2005 and Lazarus, 2000b) but also encompass the entire set of responses at the psychological, physiological, and behavioral levels (as will be described in the next section). In fact, there is no reason to believe that the all set of responses that emerge after the first level of cognitive appraisal does not produce sufficient impact in the individual in order to be faced in an appropriate way. Second, coping efforts can assume specific characteristics in the second level (justifying, for example, the use of meaning-focused), but there is also no reason to believe that these efforts only occur when the individual is facing unfavorable situations. In fact, it is possible that favorable (or not so good) situations can also trigger the need for the second level of cognitive appraisal. For example, quaternary cognitive appraisal maintains its relevance when the individual feels that he or she can achieve an even better situation or when he or she feels that despite the positive effects there are also personal or situational aspects that can be ameliorated.

In sum, for the interactive model, tertiary cognitive appraisal reflects the personal significance of the *same* stressful event that can result in threat/harm or challenge/benefit appraisals. Tertiary appraisal presupposes that the situation maintains the significant personal meaning that requires coping by the individual (importance). Quaternary appraisal includes the *new* coping strategies and personal control that are implicated in the efforts to manage the impact of the responses to the stressful events (see Figure 1). The final goal of using the second level of cognitive appraisal is achieving a better personal situation compared to the one that resulted from the first level of cognitive appraisal. Thus, all subsequent evaluations and efforts of resolution after the first level of cognitive appraisal should be included in the second level of cognitive appraisal. This is important to say because long and complex processes of human adaptation to stress can trigger more than one process of the second level of cognitive appraisal. This is the case in dealing with sources of stress that change their nature along the process. For example, in some chronic or fatal diseases, the process of being ill can start with a problem that was benign and only after a period of time become malignant and terminal. Therefore, the second level of cognitive appraisal can assume different forms and results along the process of human adaptation to stress.

In order to give a better idea of some questions that can represent the second level of cognitive appraisal, Figure 2 presents examples of psychological dilemmas during this step of the human adaptation to stress.

Cognitive processes	Examples of questions
Importance	*What is happening? Is this important to me?* *Can this affect me?*
Primary cognitive appraisal	*How am I feeling?* *What is the impact for me?* *What are the consequences for me?*
Secondary cognitive appraisal	*Do I have to do something?* *Is there anything I can do?* *What can I do?* *Which options are the best?* *When and how should I act?* *What are the consequences of my different options?*
Tertiary cognitive appraisal	*How am I feeling after dealing with the situation?* *What is the impact for me now?* *What are the consequences for me now?* *Am I in a better or worse situation?*
Quaternary cognitive appraisal	*Should I do something, or is it better to do nothing?* *Is there anything else that I can do?* *Should I change or maintain my options of action?* *When and how should I act now?* *What are the consequences of my new options?*

Figure 2. Examples of psychological dilemmas occurring during human adaptation to stress.

Psychological, Physiological, and Behavioral Responses

For the interactive model, the main aspect related to the three levels of responses implicit to a stressful situation (e.g., psychological, physiological, and behavioral) is again cognitive appraisal. Cognitive appraisal not only explains the type of responses obtained in a stressful event (e.g., anxiety, threat, increased heart rate, decrease of motivation toward the task) but also explains how the individual interprets the responses and the way he or she will respond. Taking, for example, the context of sport psychology, substantial debate exists related to the impact of emotions (particularly anxiety) on performance. Authors agree that an emotion such as anxiety represents a negative response to competitive stressors, but the main point is whether athletes interpret their anxious symptoms as beneficial or harmful to an upcoming performance (Hanton, Neil, & Mellalieu, 2008; Mellalieu, Hanton, & Fletcher, 2006). One interesting factor that can explain how athletes can turn a negative emotion into a facilitator of their performance is given by the previous referred concept of personal control (Carver & Scheier, 1988; Jones, 1995). If athletes feel some degree of control over the stressor, they tend to interpret symptoms as facilitative to performance being more able to cope with anxiety symptoms and achieve their goals. In contrast, if athletes feel no control over the stressor, they tend to interpret symptoms as debilitative to performance being less able to cope with anxiety symptoms and have negative expectancies regarding goal achievement (Jones, 1995). This same idea is reinforced in the Theory of Challenge and Threat States in Athletes proposed by Jones, Meijen, McCarthy, and Sheffield (2009); it is the interpretation of emotions that plays a major role in their facilitative

(helpful) or debilitative (unhelpful) role on performance. In the same way, these interpretations are also affected by the concept of control that explains why negative emotions can be experienced as helpful to performance.

Considering these aspects for the interactive model, the cognitive appraisal at the first level will determine the responses to the stressful event, whereas the cognitive appraisal at the second level will determine how these responses will be interpreted (e.g., positive or negative; facilitative or debilitative). After this interpretation, adaptation to stress can terminate (turning to event outcomes) or can be assumed the need of additional efforts in order to deal with the situation (e.g., quaternary cognitive appraisal).

Determining briefly the set of responses that follows the first level of cognitive appraisal, the interactive model proposes responses at the psychological, physiological, and behavioral levels (see Figure 1). These responses are usually seen as final outcomes of the stress process and include psychological indicators, such as satisfaction or commitment, physiological indicators, such as sleep disturbances or blood pressure, and behavioral indicators, such as job performance or turnover. However, the interactive model makes a distinction between *immediate and proximal* outcomes that occur *during* the process of human adaptation and *stable and prolonged* outcomes that occur *after* the same process of human adaptation. For example, in a situation of stress, it is accepted that the individual can feel fatigue and lack of energy due to a very demanding situation (outcomes). However, it is not likely that he or she immediately experiences the process of burnout (event outcomes) because this process results after a prolonged exposure to chronic stress (Maslach, Schaufeli, & Leiter, 2001). In addition, this distinction assumed in the interactive model can also better reflect the ongoing process between the first level of cognitive appraisal, the responses, and the second level of cognitive appraisal. This will result in a interactive relationship between the first level of cognitive appraisal ↔ the responses ↔ the second level of cognitive appraisal (that correspond to immediate and proximal outcomes) and the final process of human adaptation reflected in the event outcomes (that correspond to stable and prolonged outcomes).

Regarding the psychological level, the interactive model highlights the emotional responses involved in human adaptation to stress. Although many other psychological responses can be involved in human adaptation to stress and continue to be of interest to the study of the reactions to stress situations (e.g., satisfaction, tension, depression), the growing interest of the stress community in the study of emotions should be highlighted (Payne & Cooper, 2004). The focus on emotions has also begun to address the importance of not only studying the negative emotions but also the positive ones involved in stress situations (Bonanno & Keltner 1997, Folkman 1997, Folkman & Moskowitz 2000; Skinner & Brewer, 2004). There is a historical debate regarding the definition, dimensions, and types of emotions that cannot be addressed in this chapter (for a review see Frijda, 1986; Izard, 1977; Izard, Kagan, & Zajonc, 1984). However, it is important to highlight the importance of emotions in human adaptation to stress. For example, Lazarus (1991, 1999) progressed from a theory of psychological stress to a cognitive-motivational-relational theory of stress and emotions where a narrative approach to the comprehension of emotions was proposed. In his advancement of the theory, Lazarus (1999) assumed that emotions and stress should be treated as a single topic because emotional reactions are dependent of the relational meanings constructed from the relationships between the individuals and the environment. In this way, “stress generates emotional consequences but emotion encompasses all the phenomena of stress” (Lazarus & Cohen-Charash, 2001, p. 53). This lead Lazarus (1993) to analyze the meaning behind each emotion, which included three

central concepts that form the basis of his theory: (a) there are inter-individual and intra-individual differences in emotional reactions, meaning that there are no two identical emotional encounters, even for the same individual; (b) emotional reactions depend on the appraisal of the significance for well-being of what is happening, and the function of emotions is to facilitate the adaptation across the adaptational encounter; and (c) the relational meaning that is constructed in each adaptational encounter is expressed in the concept of a *core relational theme*. Lazarus (1991) advanced 15 emotions, each with a specific core-relational theme (for a complete description of these emotions, see Lazarus & Cohen-Charash, 2001). For example, for the emotion of anxiety, the core-relational theme is facing an uncertain threat that "has existential implications that go well beyond concrete and immediate threats by serving as a symbol of potential inability to survive and flourish" (p. 64).

The implications of focusing on emotion for understanding human adaptation are significant. As said by Lazarus (1999, 2001), research should assume emotions as a better expression of what individuals experience in stressful encounters than to continue to note attention to the subjective concept of stress. Emotions are triggered by cognitive appraisal and play a central role in the comprehension of adaptation to stress. This means that stress and distress are not independent of the environmental conditions or of the individual characteristics but instead are the "functional juxtaposition of both" (Lazarus & Cohen-Charash, 2001, p. 46).

In this way, it is assumed that processes of cognitive appraisal related to threat and even harm tend to be associated with negative emotions (but not always) and that processes of cognitive appraisal related to challenge and benefit tend to be associated with positive emotions (but not always). This same idea is presented by Jones et al. (2009) in their Theory of Challenge and Threat States in Athletes; this theory proposes that positive emotions are normally, but not exclusively, related to a challenge response, whereas negative emotions are normally, but not exclusively, associated with a threat response.

Regarding the physiological responses, review studies from Fried, Rowland, and Ferris (1984) and Jex and Beehr (1991) established that general research has focused on three main types of physiological symptoms: cardiovascular (e.g., blood pressure, cardiac activity, and cholesterol), biochemical (e.g., catecholamines, cortisol, and uric acid), and gastrointestinal (e.g., peptic ulcers). Research regarding the relationship between stress and physiological symptoms needs to answer questions related to the use of reliable objective (physiological) and subjective (self-report) measures of strain, the nature and consequences of acute (episodic) and ongoing (chronic) stressors (Cooper et al., 2001), and the role of cognitive appraisal on these symptoms.

Regarding the behavioral responses, the interactive model proposes the analysis of the success or failure obtained by the individual by using his or her coping efforts in order to deal with the stressful event. These behavioral responses correspond to immediate and proximal results achieved by the individual when trying to resolve or mitigate the effects of the stressful event. From this point of view, they are somewhat different from the results achieved in the event outcomes as these effects tend to be more prolonged in time and often occur after a long exposure to the stress situation. This distinction is important because behavioral responses can assume different connotations during the episode of stress, starting, for example, with a failure in dealing with the stressful event (e.g., the coping efforts were useless, and as a result, the individual felt immediate frustration that departed him or her from the situation), and end with a success result due the change of the coping effort in order to achieve a better state.

Using the example of occupational stress, the psychological strains have captured major attention from researchers (Jex & Beehr, 1991; Kahan & Byosiere, 1992). This does not mean that these responses are more important than physiological and behavioral responses, but it can reflect the fact that the researchers involved in the study of job stress typically have a background in psychology, thereby increasing the possibility of evaluating psychological responses (Jex & Beehr, 1991). For the interactive model, all three types of responses deserve equal importance, and they should be integrated in the understanding of human adaptation to stress, where cognitive appraisal plays a major role. This need is also based on research that supports the influence of cognitive appraisal in psychological, physiological, and behavioral responses to stress (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Tomaka, Blascovich, Kibler, & Ernst, 1997).

One final and interesting topic is related to the impact of cognitive appraisal on responses to a stressful event. As was the case for the amount of research conducted on cognitive appraisal versus coping, there is again more research conducted on the impact of secondary cognitive appraisal (e.g., coping efforts) on responses to stressful events than about the impact of primary cognitive appraisal (e.g., threat, harm, challenge, and benefit) on responses to stressful events. For example, interesting findings prove that some coping strategies may be associated with the regulation of positive and negative emotions. For example, Stone, Kennedy-Moore, and Neale (1995) used end-of-day diaries with a sample of 79 men to describe the day's most "bothersome" problem; the authors found that relaxation and direct action were associated with positive affect, whereas distraction and acceptance were associated with lower levels of negative affect. The opposite has also been analyzed existing empirical findings that support the influence of emotions on the selection of coping strategies (Boekaerts, 2002; Moshe, 1994).

The Interactive Process

Although the interactive model proposes a sequence of steps that occur since the stressful event triggers cognitive appraisal, the three types of responses, and the occurrence of event outcomes in human adaptation, the process is quite more complex.

First, human adaptation to stress adaptation can be completed after the first level of cognitive appraisal or even before when the individual evaluates the personal meaning – importance – of the situation to his or her well-being. This means that it is not necessary to go through the entire process of first and second levels of cognitive appraisals to have completed the process of human adaptation to stress. The process will be finished when the individual assumes that (a) the stress situation is not so important to challenge/threat his or her well-being or to mobilize coping efforts in order to deal with the source of stress; (b) coping efforts (both at first and second levels) succeeded in dealing with the situation (e.g., positive human functioning); (c) coping efforts (both at first and second levels) did not succeed in dealing with the situation and the individual feels harm in the event outcomes (e.g., negative human functioning); and (d) coping efforts (both at first and second levels) did not succeed in dealing with the situation and the individual feels that there is nothing that can be done to solve the problem, thereby accepting the situation. It is important to distinguish situations where the individual has not succeeded in dealing with the situation of stress (and because of that can use some emotion-focused coping strategies related to denial or self-distraction to avoid the source of distress without engaging in problem-focused behavior) and situations where the individual

has not succeeded in dealing with the situation of stress (and because of that can use some emotion-focused coping strategies related to venting one's emotional distress or cognitively reframing a stressor's impact). This division between situations (c) (where there is negative human functioning) and (d) (where there is not necessarily negative human functioning) is important; the way the individual copes with the failure of dealing with the stressful event can determine the event outcomes of human adaptation to stress. In fact, there is evidence that avoidant emotional coping (e.g., denial or self-distraction to avoid the source of distress) leads to mental health problems when compared to other forms of emotional coping (Coyne & Racioppo, 2000).

Second, the relation between first and second levels of cognitive appraisals is interactive, meaning that they can influence each other along the process of human adaptation to stress (and both can produce psychological, physiological, and behavior responses). For example, the harm resulting from having a bad performance (second level of cognitive appraisal) resulting from a threat perception of having too much work to do (first level of cognitive appraisal) can be followed by negative emotions, physical disturbances, and a tendency to avoid the situation; this can become even more difficult (e.g., threatening) for the individual to face not only the same situation in the future (e.g., too much work to do) but also similar situations that can happen to the individual (e.g., having a difficult task to do). Thus, the interactive model assumes that processes of cognitive appraisal can interact in such a way that can cause negative cycles of human functioning (resulting in the incapacity to deal with stressful events) or can promote positive cycles of human functioning (resulting in the capacity to deal with stressful events). This interactive process between the first and second levels of cognitive appraisals can best capture the dynamic nature of human adaptation to stress; along this process, people can feel advances and setbacks and progress and regress through a point where the individual positively or negatively adjusts to the situation.

Third, the need to not consider coping and emotion as separate entities (Lazarus, 1999) is accepted because separating the elements involved in the adaptation to stress can only provide a partial vision of the phenomenon. For example, Lazarus (1999) noted the relevance of considering emotion the "superordinate system that includes motivation (an individual's goal), appraisal, stress, emotion, and coping as components parts" (p. 101). For the interactive model, cognitive appraisal (which includes the evaluation of the effects of the stressful event and the coping efforts) and event outcomes (including psychological, physiological, and behavior outcomes) interact in a continuous way, influencing each other until event outcomes of human adaptation to stress are reached. The *slight* difference is that Lazarus (1991, 1999) put major influence on emotional processes that are implicated in the stressful encounter, while the interactive model considers equal relevant aspects related to importance, cognitive appraisal, and responses to the stressful event. Focusing on one or more of these elements can result in turning the other aspects *secondary* in the adaptation of stress; there is no substantial research that can provide evidence for this possibility.

Event Outcomes: Human Adaptation

The interactive process assumed in the model means that human adaptation results from the conjunction of a certain individual and a specific situation that interact with each other along the occurrence of the stressful event being stressed the dynamics characteristics of this process

(because of that there is a dashed line to describe the process of human adaptation to stress; see Figure 1). The dynamics of this process can turn difficult to study human adaption to stress not only because the person or the situation can change along this process but also because it can change the relation between the individual and the situation.

In general, the model proposes two main effects of adaptation to stress: positive human functioning and negative human functioning. From an historical point of view, there has been a great interest in studying the maladaptive reactions to stress (e.g., decreases in productivity, turnover, burnout, depression, anxiety), but more recently, psychological science has paid more attention to the adaptive reactions to stress (e.g., increases in productivity, will to stay in the organization, commitment, happiness, satisfaction) (for a review of these topics, see Beehr, 1995; Cooper et al., 2001; Folkman, 2011; Payne & Cooper, 2004). From a transactional point of view, there is no reason to not assume this perspective (Lazarus, 1991, 2001). In fact, if cognitive appraisal can result not only in threatening and harmful appraisals but also in challenging and beneficial appraisals, then not only can negative reactions occur in stressful situations but positive reactions can also be observed when studying human adaptation to stress. This is recognized by some authors who note the need to emphasize the study of both positive and negative emotions (Dewe, O'Driscoll, & Cooper, 2010; Dewe et al., 2013).

Overall, for the interactive model, cognitive appraisal will mediate the relationship between stressful events and event outcomes. It is known that positive human functioning will derive from an ability of the individual to use effective coping strategies in order to deal with the existing demands. When a correspondence between existing demands and individual resources has been achieved, the conditions for positive human functioning are increased. It is interesting to note that other theoretical proposals have stressed the importance of congruence between demands and abilities. The Person–Environment Fit model defends that event outcomes and human adaptation to stress is related to the fit between the person (P) and the environment (E) (Edwards et al., 1998). If there is a match between the person and the environment (P-E), then there are conditions for effective human functioning to exist. This correspondence is achieved when the demands of work match the individual abilities to overcome demands (demands-ability fit) and when there is a match between the individual's needs and the available resources (needs-supplies fit). Once again, it assumes a dynamic perspective between the individual and the environment (as in the interactive model); it values the need of considering the relation between demands and resources (as in the interactive model). The major difference is the role given by the interactive model to the processes of cognitive appraisal to explain the final result of human adaptation to stress.

THE MEDIATING ROLE OF COGNITIVE APPRAISAL AND THE NEED OF "PUTTING ALL TOGETHER"

From a theoretical and empirical point of view, the interactive model proposes that the relation between stressful events and the event outcomes will be mediated by cognitive appraisal, meaning that it can change or alter the relationship between both sets of variables. Mediators give information as to how and why a causal system operates, accounting for the relationship between the predictor and the criterion variables and providing a link between one

variable and another (Baron & Kenny, 1986), representing an interesting tool to determine the impact of cognitive appraisal on human adaptation to stress.

For the purpose of understanding the mediator role of cognitive appraisal on the relationship between stressful events and event outcomes, I would like to propose the analysis of the relation between tight deadlines (source of stress), coping appraisal, and burnout as an example. I will now have to ask permission from the reader to use my own personal example to illustrate the process of human adaptation to stress. At this very moment, I should be on vacation, corresponding to a period of rest after a long year of intense work related to classes, research, work as a sport psychologist, and all the "minor" but costly activities related to paperwork, meetings (and more meetings), and student orientation. Together, the only smart and fair thing I should be doing right now is being on a vacation. However, as the reader can verify, this is not the case. The main reason for not being on a vacation is that I was unable to write the chapter on time in order to be included in this first volume, which should already be sent to the publisher. So as editors of this book, my colleagues and I are now faced with a new tight deadline to deliver the book that should include this chapter (I hope….). Thus, the main feeling I have at this moment is stress related to tight deadlines. Let us now consider the case of burnout using the well-known dimensions proposed by Maslach (1982). Could stress due to tight deadlines turn my condition into burnout? Well, I hope not… However, I am now feeling that emotional exhaustion is increasing; as days are passing, my feelings of personal accomplishment are decreasing, and I occasionally start to feel some *minor* depersonalization regarding my children's needs to go to the swimming pool and to go for a walk. I am certainly not *burned out*, but at least I can admit a positive relation between what is happening to me (tight deadlines) and some negative feelings that characterize burnout.

With this sad example as the background, let us continue to analyze the mediator role of cognitive appraisal. However, before I go on, it should also be considered that this example will be treated as exerting some control over the situation of stress, meaning that I am not describing a source of stress where there is nothing to be done in order to control the problem. As I said before, personal control over the situation can make a difference in the usefulness of the coping strategies applied to manage the stressful event. Returning to the personal example, I admit that I have some control over the situation (and by the way, of course I am involved in an important situation). For example, giving up on the chapter does not seem to be a good option right now (my control here is low), but I can at least control some other important aspects related with this task (e.g., the hours of working per days, periods of rest, information to include in the chapter).

So, let us now begin with the hypotheses that can be tested by using the interactive model. All the possible hypotheses to test are presented in Figures 3, 4, and 5.

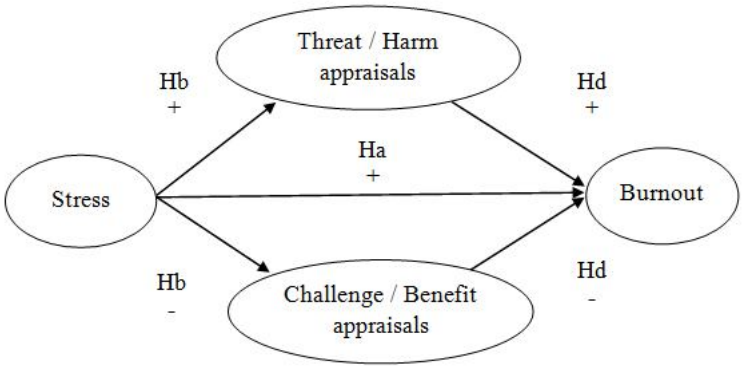


Figure 3. Mediation hypotheses for the relationship between stress, primary/tertiary cognitive appraisals, and burnout.

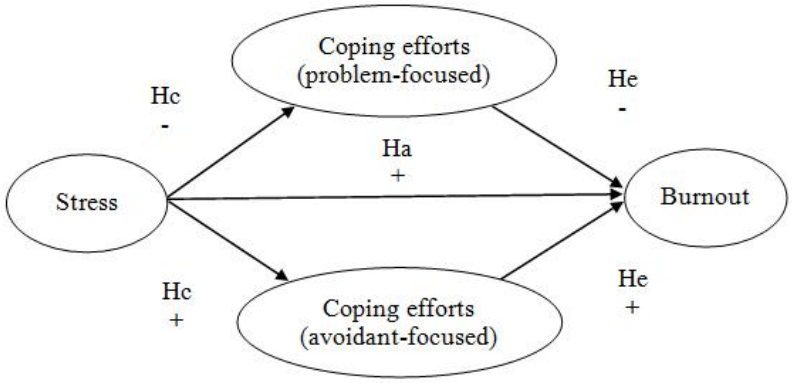


Figure 4. Mediation hypotheses for the relationship between stress, secondary/quaternary cognitive appraisals, and burnout.

For the relationship between stress and burnout, a unique hypothesis is formulated: (a) stress (as antecedent or *predictor* variable) will be positively related to burnout (as outcome or *criterion* variable); that is, tight deadlines will be positively related to burnout (this assumption is assumed by all the cases presented in Figures 3, 4 and 5). Both theoretical (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Kahn & Byosiere, 1992; Karasek & Theorell, 1990) and empirical evidence (Cano-Garcia, Padilla-Munoz, & Carrasco-Ortiz, 2005; Hakanen, Bakker, & Schaufeli, 2006) suggest this relation.

In what concerns primary and tertiary cognitive appraisals, one hypothesis can be formulated: (b) stress will be positively related to threat and harm cognitive appraisals (both at the first and second levels) and negatively related to challenge and benefit cognitive appraisals (both at the first and second levels; left side of Figure 3). Turning again to my personal example, I should admit that I started with a major sense of challenge (thinking that I would be able to finish the chapter in the period that I personally defined). I am now a little more threatened by the fact of not having fulfilled the deadline and even feel some harm by not resting with my family. Overall, the sense of challenge is still prevalent over the other two cognitive appraisals, meaning that I am still motivated for the task, feeling that it is a job that deserves to be done and that challenges my own personal skills.

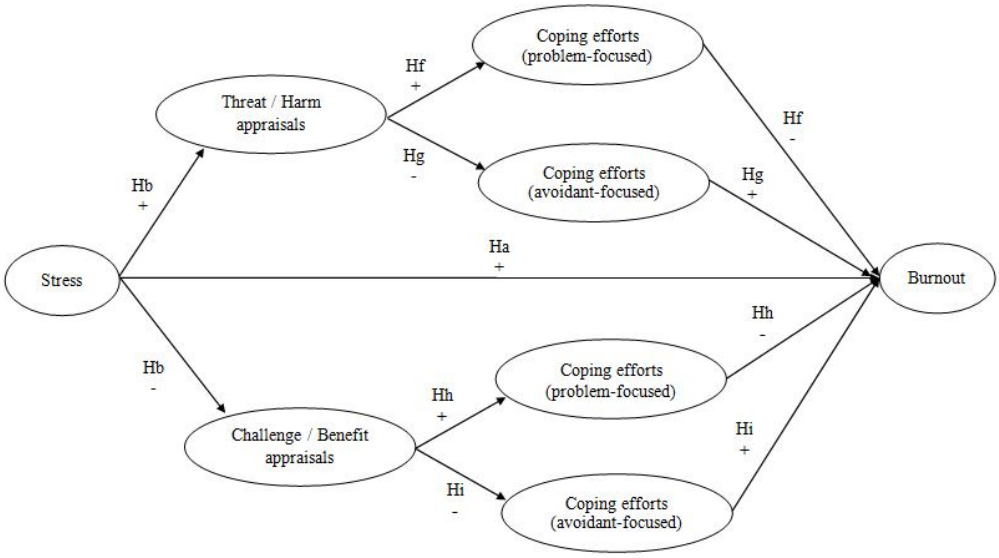


Figure 5. Mediation hypotheses for the relationship between stress, cognitive appraisals (first and second levels), and burnout.

Regarding coping efforts, one hypothesis can be formulated: (c) stress will be negatively related to coping efforts that intend to change the person-environment relation (e.g., problem-focused strategies) and positively related to coping efforts that do not intend to change the person-environment relation (e.g., avoidant emotional coping; left side of Figure 4). Applying this to my case, the major factor not turning my condition into burnout is the predominant use of problem-focused strategies mixed with emotion-focused strategies. In fact, all my efforts are focused on doing this chapter as fast as I can (and I just realize that if I was not using my personal example here, I could end this part of the chapter faster; oh God…). Using some humor strategies (at this very moment, I received an email from the other editor of this book Rui Resende – my poor friend who is also working on this book on vacation – and he was saying that he will have to stop working for a while because he has to take his lovely daughter Inês to Oporto, a city near the place where he is working right now. I just answered him saying that we should get a boyfriend for his daughter because that is what they serve for…). Well, let us turn back to our task, reinforcing this idea that for the same situation of stress I am using both problem-focused coping (most of the time) and emotion-focused coping (some of the time)…

Not much research can be described to support hypotheses (b) and (c). However, there is evidence regarding the differential effects of cognitive appraisal (e.g., threat and challenge appraisals) on individuals; for example, threat appraisal has been related to negative consequences as low coping expectancies and anxiety (Lazarus & Folkman, 1984; Sarason & Sarason, 1990; Skinner & Brewer, 1999), whereas challenge perception has been related to positive consequences as excitement in the anticipation of personal benefits (Lazarus & Folkman, 1984; Lazarus, Kanner, & Folkman, 1980). In the case of coping, research supports the idea that coping potential can affect the way individuals deal with work demands (Mearns & Cain, 2003) and that more coping resources mitigate the strain produced by work stressors (Karasek & Theorell, 1990; Pithers, 1995).

Moving now to the mediational role of cognitive appraisal, two hypotheses can be formulated: (d) regarding primary and tertiary cognitive appraisals, cognitive appraisal will mediate the relationship between stress and burnout, meaning that the relationship will be positive between stress to threat/harm appraisals (both at the first and second levels) and to burnout and will be negative between stress to challenge/benefit appraisals (both at the first and second levels) and to burnout (right side of Figure 3); (e) regarding secondary and quaternary cognitive appraisals, cognitive appraisal will mediate the relationship between stress and burnout, meaning that the relationship will be negative between stress to coping efforts that intend to change the person-environment relation (e.g., problem-focused strategies) and to burnout and will be positive between stress to coping efforts that do not intend to change the person-environment relation (e.g., avoidant emotional coping) and to burnout (right side of Figure 4). Let me turn now for one last time to my personal example. When I realized that I would not be able to finish the chapter by the first deadline, I felt upset and somewhat anxious because it compromised my vacation (at this moment, I am still hoping to complete the task on time to take a few days of rest). First, the level of cognitive appraisal made its influence at that moment. However, is the process over at this moment? Of course not. This is the moment where tertiary and quaternary processes of cognitive appraisal come into play. Again (and because the situation continues to maintain importance and personal control) there is a need to evaluate how the situation is perceived (tertiary cognitive appraisal) and how it can be managed (quaternary cognitive appraisal). In my case, a mix of threat and challenge appraisals comes together after the setback of not having finished the chapter on time, but as in the first level of cognitive appraisal, the willingness and motivation to continue the task gained advantage to some discouragement and even anxiety of having not finished the task. This *new* situation reinforced the need for reviewing and delivering new coping efforts (e.g., provide more time to accomplish the task, organizing the information better to include in the chapter). My main point is that this interactive process occurred in the same situation and only by including all the factors in the analysis of the stressful encounter (using the words of Lazarus) can one give meaning to comprehend how adaptation is explained. Of course, the reader may be asking at this moment if these processes of cognitive appraisal can proceed at this second level of cognitive appraisal (well, I hope not for my example…). The interactive model provides the basis for the two levels of cognitive appraisal, meaning that all *new* appraisals and efforts to deal with the situation should be integrated in the second level of cognitive appraisal.

Considering these aspects, comprehending human adaptation makes it necessary to put together these processes, maintaining as the major point the mediational role of cognitive appraisal. Keeping in mind that we are still talking about manageable situations, four last hypotheses may be formulated (Figure 5). All of these hypotheses are based on the same principle that cognitive appraisals (both at the first and second levels) will mediate the relationship between stress and burnout, in these terms: (f) the conjunction of a threat appraisal used with problem-focused strategies will be negatively related to burnout; (g) the conjunction of a threat appraisal used with avoidant-focused strategies will be positively related to burnout; (h) the conjunction of a challenge appraisal used with problem-focused strategies will be negatively related to burnout; and (i) the conjunction of a challenge appraisal used with avoidant-focused strategies will be positively related to burnout. Two aspects should be mentioned at this time. First, only two major groups of coping strategies were provided in this example (e.g., problem-focused and avoidant-focused); introducing other types of coping strategies can modify the relations within the model. However, it is sustained that cognitive

appraisal will continue to assume a mediator role in these cases. Second, this set of hypotheses was formulated under the conditions that individuals are attributing importance to the stressful situation and that some control could be exerted in the situation. In this last case of control perception, if the situation has no positive resolution and can only get worse, then the relationships between variables may well be just the opposite but only future research can confirm this hypothesis.

Unfortunately, little research exists to sustain the complete set of hypotheses, particularly from (d) to (i) hypotheses (the mediational ones). In fact, despite the evidence that some variables, such as intrinsic motivation, mediate the relationship between stress and burnout (see Rubino, Luksyte, Perry, & Volpone, 2009), there is little evidence regarding the mediational impact of cognitive appraisal on the relationship between stress and burnout or other outcomes. However, Gomes, Faria, and Gonçalves (in press) completed a study with college teachers and found that primary (e.g., threat perception and challenge perception) and secondary (e.g., coping potential and control perception) cognitive appraisals partially mediated the relationship between occupational stress and burnout at work. These findings provided encouraging evidence for the importance of developing more studies on the impact of cognitive appraisal in human adaptation to stress. Additionally, Goh et al. (2010), in an interesting study of nurses and administration employees from Australia, found empirical evidence for the relation between primary appraisal, secondary appraisal, stress, and coping, supporting the main prepositions of the transactional model (Lazarus & Folkman, 1984).

QUESTIONS FOR FUTURE RESEARCH

Due the difficulties of studying processes implicated in human adaptation to stress, there seems to be more answers than solutions to explain the dynamic nature between the person-environment relationships in stressful events. Regarding the Interactive Model of Human Adaptation to Stress, the main questions are described below.

- Generally speaking, the interactive model as a process-oriented approach assumes the sequential relation stressful event – cognitive appraisal – responses – event outcomes. As discussed previously, cognitive appraisal should be analyzed as a mediating variable between stress and event outcomes (e.g., negative and positive human functioning). The antecedent variables proposed in the model also deserve research attention and could assume the statute of moderator variables between the predictor variables (stressful event) and the criterion variables (negative and positive human functioning). By assuming the role of antecedent variable they "affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (Baron & Kenny, 1986, p. 1174).
- The sequential relations assumed in the interactive model are, however, only one of the existing possibilities. For example, stress can be seen as a mediator variable between antecedent variables (e.g., coping style, social support) and consequent variables (e.g., burnout) (see Raedeke & Smith, 2004). Additionally, the way variables are understood and measured can influence their status during data analysis. As stated by Harris (1995), if coping and appraisal can transform the relationship between the

person/environment fit and the emotional responses, they should be understood as mediating variables in the transaction process; however, if it is acknowledged that coping can be represented as an individual tendency/style, then it can become an antecedent variable that can change the causal structure of the transaction between the person/environment fit. Reinforcing this idea, Harris stated that it is not only a matter of discussion if coping should be analyzed as a moderator or a mediator; it can also help to "address one of the more important questions for occupational stress researchers: Does coping have stronger effects on stress or does stress have stronger effects on coping?" (p. 23).

- Antecedent factors and cognitive appraisal processes are involved in human adaptation to stress. However, how much does each one contribute to explain human adaptation? Can certain personality traits play a central role in the response to stress? Can certain situational characteristics exert a major influence that overcomes personal differences between individuals involved in a stress event? Alternatively, can cognitive appraisal assume a central role ameliorating or deteriorating human adaptation?
- In addition to evaluating each part of the transaction between the individual and the environment, it becomes crucial to evaluate the cognitive, emotional, and behavioral processes that occur between the stress event, the situation and personal characteristics, the ongoing process of cognitive appraisal, and the human response to that situation. By including these factors, research can more closely respond to the ultimate question of human adaptation to stress, namely, the reason why individuals differ in their response to stressful events.
- Due to the fundamental influence of cognitive appraisal on human adaptation to stress, there is also a lack of research regarding the impact of cognitive appraisal (from primary and secondary appraisals to tertiary and quaternary appraisals), both at the process level (i.e., capturing the ongoing transaction between the individual and the situation) and at the style level (i.e., disposition tendency to use the same type of cognitive appraisal consistently across situations and time). As referred by Lazarus (1991), there is a scarce amount of research on this topic mainly concerning the use of consistent styles of appraisal to cope with stress and also regarding the use of situational appraisal (i.e., directed at a specific encounter or setting) and generalized appraisal (i.e., global patterns that transcend a specific encounter but that can be perceived by the individual as relevant).

KEY POINTS TO PROMOTE POSITIVE HUMAN FUNCTIONING

Based on the discussion so far, brief implications are presented below to promote positive human functioning in situations where stress has to be faced and that derive from the Interactive Model of Human Adaptation to Stress.

- Despite the individual nature of human adaptation to stress, there are reasons to believe that intervention in promoting positive human functioning benefits from providing "friendly places to performance". Designing expectable and fair places to work can

represent a better way of reducing stress than training and preparing individuals to deal with "unfriendly places to performance".

- Given that some personal characteristics do not change easily and quickly (e.g., personal traits), there are advantages to helping individuals know their personal strengths and weaknesses in order to make changes that can make these individuals more apt to deal with stress.
- Giving importance to a situation is often a sign of involvement and motivation toward a certain task or job; however, excess importance can make the situation much more decisive than it is in reality. In this way, there are advantages to educating individuals to include all different facets of their lives in a parsimonious living perspective, thus being more likely to appraise stressful events as "just" one part of their everyday life.
- Challenge and even benefit appraisals can be promoted if individuals define specific and realistic goals and evaluate their performance using personal standards instead of external and comparative indicators of performance. Almost all (if not all) places of performance are sensitive to programs of goal-setting that can promote the individual's feelings of competency and efficacy. By having individuals optimistic about their skills to overcome stress and concentrated in their own performance, there will be less likelihood of threat and harm appraisals.
- More important than the number of coping skills possessed by the individual, it is important to train individuals to use in a efficacious way a restricted set of coping skills; this should include strategies to use when there is something that can be done in order to change the situation (problem-focused) as well as when there is nothing that can be done to change the situation except adapt the best way possible (emotion-focused).
- The adaptation to stressful situations is very dependent on personal control. Individuals should have at least some control over their tasks and roles in the performance situation. There are no excuses to not give control to individuals in order to do their tasks, even in very stable and routinized places of performance. Little control is better than no control.
- Responses to stressful events are automatic. However, people can be trained to change their responses to these events or at least to control their reactions. Most often, people are not even aware of the relationship between a stressful event and a specific personal reaction; when they realize that connection, they start to gain control over the situation. If training is used in advance, their chances of controlling negative effects of stress increase dramatically.
- Coping with stressful events is an ongoing and often unfinished process. This implies that individuals should be educated regarding the cycles of stress and most important people should be trained in how to use their coping skills in their lives.
- Finally, society and each human being should not expect less than positive human functioning. This is not to say that negative human functioning should be banned from human existence because it is a part of becoming a better person. However, what seems intolerable is having individuals in performance situations where what they can expect is to not make the situation worse than it is. Human beings should expect to be happy most of the time, even when they are in very demanding performance settings.

CONCLUSION

I would like to finish the way I started this chapter, by emphasizing that the relationship between stress and human adaptation is far from simple. Major factors involved in this relationship were presented. Despite the importance of each one, major attention should be given to the processes of cognitive appraisal. Perhaps there is not an influential factor to explain why different individuals submitted to the same stressful situation can react and adapt in different ways, and why the same individual submitted to similar situations can react and adapt in different ways. However, the complexities of studying all factors involved in the stress process become very difficult to figure out the role of cognitive appraisal on human adaptation to stress; however, there is growing evidence from empirical studies that confirm the influence of cognitive appraisal, turning this path into a challenging one.

REFERENCES

Arnold, M. B. (1960). Emotion and personality. Vol. 1: Psychological aspects. New York: Columbia University Press.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology,* 51(6), 1173-1182.

Beehr, T. A. (1995). Psychological stress in the workplace. London: Routledge.

Blascovich, J., Mendes, W. B., Hunter, S. B., Lickel, B., & Kowai-Bell, N. (2001). Perceiver threat in social interactions with stigmatized others. *Journal of Personality and Social Psychology,* 80, 253-267.

Boekaerts, M. (2002). Intensity of emotions, emotional regulation, and goal framing: How are they related to adolescents' choice of coping strategies? *Anxiety, Stress and Coping,* 15, 401-412.

Bolgar, M. R., Janelle, C., & Giacobbi, Jr., P. R. (2008). Trait anger, appraisal, and coping differences among adolescent tennis players. *Journal of Applied Sport Psychology,* 20, 73-87.

Bonanno, G. A., & Keltner, D. (1997). Facial expressions of emotion and the course of conjugal bereavement. *Journal of Abnormal Psychology,* 106, 126-137.

Cano-Garcia, F. J., Padilla-Munoz, E. M., & Carrasco-Ortiz, M. A. (2005). Personality and contextual variables in teacher burnout. *Personality and Individual Differences,* 38(4), 929-940.

Carver, C. S., & Scheier, M. F. (1988). A control-process perspective on anxiety. *Anxiety Research: An International Journal,* 1, 17-22.

Carver, C. S., & Scheier, M. F. (1994). Situational coping and coping dispositions in a stressful transaction. *Journal of Personality and Social Psychology,* 66, 184-195.

Cassar, V., & Tattersall, A. (1998). Occupational stress and negative affectivity in Maltese nurses: Testing moderating influences. *Work & Stress,* 12(1), 85-94.

Cerin, E. (2003). Anxiety versus fundamental emotions as predictors of perceived functionality of pre-competitive emotional states, threat, and challenge in individual sports. *Journal of Applied Sport Psychology*, 15(3), 223-238.

Cohen, S., & Edwards, J. (1989). Personality characteristics as moderators of the relationship between stress and disorder. In R. W. J. Neufeld (Ed.), Advances in the investigation of psychological stress (pp. 235-283). Oxford: John Wiley & Sons.

Cooper, C. L., & Dewe, P. J. (2004). Stress: A brief history. Oxford: Blackwell.

Cooper, C. L., Dewe, P. J., & O`Driscoll, M. O. (2001). Organizational stress: A review and critique of theory, research, and applications. London: Sage.

Cooper, C. L., & Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. *Journal of Occupational Psychology*, 49, 11-28.

Cox, T. (1985). *Stress* (2nd ed.). New York: Macmillan.

Coyne, J. C., & Racioppo, M. W. (2000). Never the twain shall meet? Closing the gap between coping research and clinical intervention research. *American Psychologist*, 55, 655-664.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands–resources model of burnout. *Journal of Applied Psychology*, 86(3), 499-512.

Dewe, P. J., O'Driscoll, M. P., & Cooper, C. L. (2010). Coping with work stress: A review and critique. Chichester, UK: Wiley.

Dewe, P. J., O'Driscoll, M. P., & Cooper, C. L. (2013). Theories of psychological stress at work. In R. J. Gatchel & I. J. Schultz (Eds.), Handbook of occupational health and wellness (pp. 23-38). New York: Springer.

Dugdale, J. R., Eklund, R. C., & Gordon, S. (2002). Expected and unexpected stressors in major international competition: Appraisal, coping, and performance. *The Sport Psychologist*, 16, 20-33.

Edwards, J. R., Caplan, R. D., & Van Harrison, R. (1998). Person-Environment Fit Theory: Conceptual foundations, empirical evidence, and directions for future research. In C. L. Cooper (Ed.), Theories of organizational stress (pp. 28-68). New York: Oxford University Press.

Fletcher, D., & Fletcher, J. (2005). A meta-model of stress, emotions and performance: Conceptual foundations, theoretical framework, and research directions [Abstract]. *Journal of Sports Sciences*, 23(2), 157-158.

Fletcher, D., Hanton, S., & Mellalieu, S. D. (2006). An organizational stress review: Conceptual and theoretical issues in competitive sport. In S. Hanton and S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 321-374). Hauppauge NY: Nova Science.

Focht, B. C., & Hausenblas, H. A. (2004). Perceived evaluative threat and state anxiety during exercise in women with social physique anxiety. *Journal of Applied Sport Psychology*, 16, 361-368.

Folkman S. (1997). Positive psychological states and coping with severe stress. *Social Science & Medicine*, 45, 1207-1221.

Folkman, S. (2008). The case for positive emotions in the stress process. *Anxiety, Stress, & Coping*, 21(1), 3-14.

Folkman, S. (2011). Stress, health, and coping: Synthesis, commentary, and future directions. In S. Folkman (Ed.), The Oxford handbook of stress, health, and coping (pp. 453-462). Oxford: Oxford University Press.

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., De Longis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping and encounter outcomes. *Journal of Personality and Social Psychology*, *50*, 992-1003.

Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, 50, 571-579.

Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist*, 55(6), 647-654.

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, 55, 745-774.

Fried, Y., Rowland, K. M., & Ferris, G. R. (1984). The physiological measurement of work stress: A critique. *Personnel Psychology*, 37, 583-615.

Frijda, N. H. (1986). The Emotions. Cambridge: Cambridge University Press.

Goh, Y. W., Sawang, S., & Oei, T. P. S. (2010). The Revised Transactional Model (RTM) of Occupational Stress and Coping: An improved process approach. *The Australian and New Zealand Journal of Organisational Psychology*, 3(1), 13-20.

Gomes, A. R., Faria, S., & Gonçalves, A. M. (in press). Cognitive appraisal as a mediator in the relationship between stress and burnout. Work & Stress.

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, 43(6), 495-513.

Hanton, S., Neil, R., & Mellalieu, S. D. (2008). Recent developments in competitive anxiety direction and competition stress research. *International Review of Sport and Exercise Psychology*, 1(1), 45-57.

Harris, J. R. (1995). An examination of the transaction approach in occupational stress research. In R. Crandall & P. L. Perrewé (Eds.), Occupational stress: A handbook (pp. 21-28). Washington, DC: Taylor & Francis.

Izard, C. E. (1977). Human emotions. New York: Plenum Press.

Izard, C. E., Kagan, J., & Zajonc, R. B. (Eds.) (1984). Emotions, cognition, and behavior. New York: Cambridge University Press.

Jenkins, R. (1991). Demographic aspects of stress. In C. L. Cooper & R. Payne (Eds.), Personality and stress: Individual differences in the stress process (pp. 107-32). New York: Wiley.

Jex, S. M., & Beehr, T. A. (1991). Emerging theoretical and methodological issues in the study of workrelated stress. *Research in Personnel and Human Resources Management, 9*, 311-365.

Johnson, J. V., & Hall, E. M. (1988). Job strain, workplace social support and cardiovascular disease: A cross-sectional study of a random sample of Swedish working population. *American Journal of Public Health*, 78, 1336-1342.

Johnson, J. V., Hall, E. M., & Theorell, T. (1989). Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population. *Scandinavian Journal of Work, Environment and Health*, 15, 271-279.

Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology*, 86(4), 449-478.

Jones, M. V., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and threat states in athletes. *International Review of Sport and Exercise Psychology*, 2(2), 161-180.

Jordet, G., & Elferink-Gemser, M. T. (2012). Stress, coping, and emotions on the world stage: The experience of participating in a major soccer tournament penalty shootout. *Journal of Applied Sport Psychology*, 24(1), 73-91.

Kahn, R. L., & Byosiere, P. (1992). Stress in organizations. In M. D. Dunnette & L. M. Hough (Eds.), Handbook of industrial and organizational psychology (2nd ed., Vol. 3, pp. 571-651). Palo Alto, CA: Consulting Psychologists Press.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24(2), 285-308.

Karasek, R. A., & Theorell, T. (1990). Healthy work: Stress, productivity, and the reconstruction of working life. New York: Basic Books.

Kirschbaum, C. (1999). Mental stress follows mental rules. *Journal of Clinical Endocrinology and Metabolism*, 84, 4292.

Kuiper, N. A., McKenzie, S. D., & Belanger, K. A. (1995). Cognitive appraisals and individual differences in sense of humor: Motivational and affective implications. *Personality and Individual Differences, 19*, 359-372.

Lazarus, R. S. (1966). Psychological stress and the coping process. New York: McGraw-Hill.

Lazarus, R. S. (1991). Emotion and adaptation. New York: Oxford University Press.

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, 44, 1-21.

Lazarus, R. S. (1995). Psychological stress in the workplace. In R. Crandall & P. L. Perrewé (Eds.), Occupational stress: A handbook (pp. 3-14). Washington, DC: Taylor & Francis.

Lazarus, R. S. (1999). Stress and emotion: A new synthesis. London: Springer.

Lazarus, R. S. (2000a). Emotions and interpersonal relationships: Towards a person-centred conceptualization of emotions and coping. *Journal of Personality*, 74, 9-46.

Lazarus, R. S. (2000b). How emotions influence performance in competitive sports. *The Sport Psychologist*, 14(3), 229-252.

Lazarus, R. S. (2001). Relational meaning and discrete emotions. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), Appraisal processes in emotion (pp. 37-67). Oxford: Oxford University Press.

Lazarus, R. S., & Cohen-Charash, Y. (2001). Discrete emotions in organizational life. In R. L. Payne & C. L. Cooper (Eds.), Emotions at work: Theory, research and applications for management (pp. 45-81). Chichester: John Wiley & Sons, Ltd.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer.

Lazarus, R. S., Kanner, A. D., & Folkman, S. (1980). Emotions: A cognitive-phenomenological analysis. In R. Plutchik & H. Kellerman (Eds.), Theories of emotion (pp. 189-217). New York: Academic Press.

Lundberg, U., & Cooper, C. L. (2011). The science of occupational health: Stress, psychobiology, and the new world of work. Chichester: Wiley.

Macrodimitris, S. D., & Endler, N. S. (2001). Coping control and adjustment in Type 2 diabetes. *Health Psychology*, 20, 208-216.

Marchant, D. B., Andersen, M. B., & Morris, T. (1997). Perceived uncertainty of outcome as a contributing factor in competitive state anxiety. *Australian Journal of Science and Medicine in Sport*, 29, 41–46.

Maslach, C. (1982). Burnout: The costs of caring. Englewood Cliffs, NJ: Preventive-Hall.

Maslach, C., Schaufeli, W.B., & Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology*, 52, 397-422.

McGrath, J. E. (1970). Social and psychological factors in stress. New York: Holt, Rinchart and Winston.

Mearns, J., & Cain, J. E. (2003). Relationships between teachers' occupational stress and their burnout and distress: Roles of coping and negative mood regulation expectancies. *Anxiety, Stress and Coping*, 16(1), 71-82.

Meijen, C., Jones, M. V., McCarthy, P. J., Sheffield, D., & Allen, M. S. (2013). Cognitive and affective components of challenge and threat states. *Journal of Sports Sciences*, 31(8), 847-855.

Mellalieu, S. D., Hanton, S., & Fletcher, D. (2006). A competitive anxiety review: Recent directions in sport psychology research. In S. Hanton & S. D. Mellalieu, (Eds.), Literature reviews in sport psychology (pp. 1-45). Hauppauge, NY: Nova Science.

Moshe, Z. (1994). Personal and contextual determinants of coping and anxiety in an evaluative situation: A prospective study. *Personality and Individual Differences*, 16, 899-918.

Nelson, D. L., & Quick, J. C. (1985). Professional women: Are distress and disease inevitable? *Academy of Management Review*, 10, 206-213.

Newton, T. J., & Keenan, A. (1990). The moderating effect of the Type A behavior pattern and locus of control upon the relationship between change in job demands and change in psychological strain. *Human Relations*, 43, 1229-1255.

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology*, 2, 115-144.

Payne, R. L. (1988). Individual differences in the study of occupational stress. In C. L. Cooper & R. L. Payne (Eds.), Causes, coping and consequences of stress at work (pp. 209-232). New York: John Wiley.

Payne, R. L., & Cooper, C. L. (Eds.) (2004). Emotions at work: Theory, research and applications for management. Chichester, UK: Wiley.

Perrez, M., & Reicherts, M. (1992). Stress, coping and health. A situation-behaviour approach theory, methods, applications. Seattle: Hogrefe & Huber.

Pithers, R. T. (1995). Teacher stress research: Problems and progress. *British Journal of Educational Psychology*, 65(4), 387-392.

Raedeke, T. D., & Smith, A. L. (2004). Coping resources and athlete burnout: An examination of stress mediated and moderation hypotheses. *Journal of Sport & Exercise Psychology*, 26, 525-541.

Ress, D. W., & Cooper, C. L. (1992). The Occupational Stress Indicator locus of control scale: Should this be regarded as a state rather than trait measure? *Work & Stress*, 6(1), 45-48.

Rubino, C., Luksyte, A., Perry, S. J., & Volpone, S. D. (2009). How do stressors lead to burnout? The mediating role of motivation. *Journal of Occupational Health Psychology*, 14(3), 289-304.

Sarason, I. G., & Sarason, B. R. (1990). Test anxiety. In H. Leitenberg (Ed.), Handbook of social-evaluative anxiety (pp. 475-495). New York: Plenum.

Schnider, K. R., Elhai, J. D., & Gray, M. J. (2007). Coping style use predicts posttraumatic stress and complicated grief symptom severity among college students reporting a traumatic loss. *Journal of Counseling Psychology*, 54, 344-350.

Schneider, T. R. (2008). Evaluations of stressful transactions: What's in an appraisal? *Stress and Health*, 24(2), 151-158.

Schwarzer, R., & Schwarzer, C. (1996). A critical survey of coping instruments. In M. Zeidner & N. S. Endler (Eds.), Handbook of coping: Theory, research, applications (pp. 107-132). New York: Wiley.

Shirom, A., Shechter Gilboa, S., Fried, Y., & Cooper, C. L. (2008). Gender, age and tenure as moderators of work-related stressors' relationships with job performance: A meta-analysis. *Human Relations*, 61(10), 1371-1398.

Skinner, N., & Brewer, N. (1999). Temporal characteristics of evaluation anxiety. *Journal of Anxiety Disorders*, 13(3), 293-314.

Skinner, N., & Brewer, N. (2004). Adaptive approaches to competition: Challenge appraisals and positive emotion. *Journal of Sport & Exercise Psychology*, 26(2), 283-305.

Spector, P. E., & O'Connell, B. J. (1994). The contribution of individual dispositions to the subsequent perceptions of job stressors and job strains. *Journal of Occupational and Organizational Psychology*, 67, 1-11.

Stone, A. A., Kennedy-Moore, E., & Neale, J. M. (1995). Association between daily coping and end-of-day mood. *Health Psychology*, 14, 341-349.

Terry, D. J., & Hynes, G. J. (1998). Adjustment to a low-control situation: Reexamining the role of coping responses. *Journal of Personality and Social Psychology*, 74(4), 1078-1092.

Thatcher, J., & Day, M. C. (2008). Re-appraising stress appraisals: The underlying properties of stress in sport. *Psychology of Sport and Exercise*, 9, 318-335.

Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 66, 248-260.

Tomaka, J., Blascovich, J., Kibler, J., & Ernst, J. M. (1997). Cognitive and physiological antecedents of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 73, 63-72.